

REMARKS/ARGUMENTS

Reconsideration and allowance of this application are respectfully requested. Currently, claims 1-16 are pending in this application.

Allowable Subject Matter:

The Office Action indicated that claims 2, 4-9 and 11-16 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. By this Amendment, claims 2, 4, 6, 8, 9, 11 and 14 have been rewritten in independent form (although it is noted that “means” phraseology in these claims have been deleted). These claims are thus allowable. Claims 5, 7, 12-13 and 15-16 are allowable as being dependent from one these newly rewritten independent claims.

Rejection Under 35 U.S.C. §102:

Claims 1 and 3 were rejected under 35 U.S.C. §102 as allegedly being unpatentable over Wang et al (U.S. ‘752, hereinafter “Wang”). Applicant respectfully traverses this rejection.

For a reference to anticipate a claim, each element must be found, either expressly or under principles of inherency, in the reference. Each claim element is not found in Wang. For example, Wang fails to disclose or even suggest “temporarily inputting a test signal including an alternating-current component through said signal line to said cell undergoing abnormality detection, said alternating-current component being above 1 kHz,” as required by independent

claim 1. Similarly, Wang fails to disclose or even suggest “temporarily inputting a test signal including an alternating-current component through the signal lines to a specified cell of said plurality of cells, said alternating-current component being above 1 kHz,” as required by independent claim 3.

As described on page 3, lines 12 *et seq.* of the originally-filed specification, exemplary embodiments of the present invention relate to cell electrodes being made to have a two-dimensional spread for securing a quantity of oxygen moving in a solid electrolyte material, the equivalent circuit to the cell thereby having a relatively large parasitic capacity. The impedance for an alternating-current component is thus much lower as compared with the impedance in a disconnection portion when a disconnection abnormality occurs in the cell. Accordingly, the response signal varies widely in accordance with the presence or absence of a disconnection. This enables clear discrimination from a signal of a current flowing in the signal line in a steady state due to the interference with the other cells.

More specifically, as described in page 20, lines 25 *et seq.* of the originally-filed specification, a control circuit 2 is designed to detect an impedance with respect to a cell (monitor cell) 1b as a representative, and the impedance to be detected is an impedance between both the electrodes 123 and 125. At the impedance detection, the instruction voltage from the D/A 0 is varied to the positive side or negative side in a moment (this voltage variation is attenuated by

the LPF 241), and a sinewave-like alternating current component is included in an application voltage V_c (i.e., a monitor cell voltage V_m) to the chamber side monitor electrode 123 of the monitor cell 1b. In the microcomputer 28, the impedance is obtained on the basis of a voltage variation of the monitor cell voltage V_m and a current variation of the monitor cell current I_m at that time. In this case, for the accurate decision on whether or not disconnection abnormality of the signal line occurs, the alternating-current component is preferably above 1 kHz (high frequency). A signal having an alternating-current component above 1 kHz is used so as to enable the disconnection abnormality detection of a signal line.

While Wang discloses detecting an abnormality of a limiting current characteristic of a pump cell (detection on the flatness characteristic in the limiting current region), Wang fails to disclose a signal having an alternating current component as claimed above. Accordingly, Applicant submits that claims 1 and 3 are not anticipated by Wang and therefore respectfully requests that the rejection of these claims under 35 U.S.C. §102 be withdrawn.

Claim 10 was rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Warburton (U.S. '186). Applicant respectfully traverses this rejection. Independent claim 10 requires, *inter alia*, "temporarily inputting a test signal including an alternating-current component through said signal line with respect to a cell undergoing abnormality detection, said alternating-current component being above 1 kHz." While Warburton discloses making a decision on

the deterioration on the basis of a variation (increase) of an alternating-current internal resistance (impedance), Warburton fails to teach or suggest the above claim limitation.

The alternating-current component (in a high frequency region) of exemplary embodiments of the present invention is temporarily (short time) applied to a cell so that the current application for a long time can decompose oxygen to affect the gas concentration detection in a normal state.

On the other hand, in Warburton, a decision on the degradation (lifetime) of an element is made on the basis of a variation in alternating-current internal resistance (impedance) of an element. To find the internal resistance variation, a variation in element signal output is used with respect to a low-frequency region (approximately several Hz) as shown in Fig. 7 of Warburton. Namely, Fig. 7 (and associated written description) provides an illustration of a variation of element signal output in a low-frequency region.

Exemplary embodiments of the present invention utilize a value of a signal output (response signal) relative to an applied signal in a high-frequency region for making a decision as to whether an element is in a normal condition or in a disconnected condition, whereas Warburton utilizes a signal output variation in a low-frequency region for the detection of degradation.

KUROKAWA et al.
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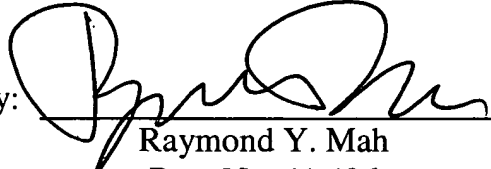
Accordingly, Applicant respectfully submits that claim 10 is not anticipated by Warburton, and respectfully requests that the rejection of this claim under 35 U.S.C. §102 be withdrawn.

Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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